UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/803,087	03/18/2004	Mitsuru Hasegawa	PHCF-04015	4164

21254 7590 11/01/2006

MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER	
ZERVIGON, RUDY	

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

8

Office Action Summary	Application No.	Applicant(s)	
	10/803,087	HASEGAWA ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-6,8,9,11-14 and 16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-6,8,9,11-14 and 16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102/103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 3-6, 8, 9, 11-14, and 16 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Okase; Wataru (US 5,592,581 A). Okase teaches a semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23), comprising: a reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) that includes a gas flow path (65,66; Figure 7) to allow source gas to pass through a substrate (2; Figure 7) mount site (support for 2; Figure 7) upon which to mount a substrate being provided in the gas flow path (65,66; Figure 7) inside the reaction vessel, said substrate mount site (support for 2; Figure 7) being located on an inside surface of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) along a first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23); a heater (76; Figure 7; column 9; lines 62-67) that is disposed outside of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) on said first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) along which the substrate mount site (support for 2; Figure 7) inside the reaction vessel is mounted; a cooling device (75; Figure 7; column 9, line 47 - column 10, line 23) that is disposed outside of the reaction vessel (processing vessel within and including 72;

Figure 7; column 9, line 47 - column 10, line 23) on a second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) substantially directly opposite to the heater (76; Figure 7; column 9; lines 62-67), said cooling device controlling an internal temperature of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) in a first section of the gas flow path where the substrate mount site (support for 2; Figure 7) is located; and a thermal conductivity adjusting member ("ceramic wool" inside 72; Figure 7; column 9, lines 53-61) that is disposed between the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) and the cooling device (75; Figure 7; column 9, line 47 - column 10, line 23); wherein the thermal conductivity adjusting member ("ceramic wool" inside 72; Figure 7; column 9, lines 53-61) allows the first section along the gas flow path where the substrate mount site (support for 2; Figure 7) is located to have a thermal conductivity different from that of a second section along the gas flow path in order to lower a thermal diffusion effect of the source gas in the first section, as claimed by claim 1. That Okase's thermal conductivity adjusting member ("ceramic wool" inside 72; Figure 7; column 9, lines 53-61) comprises a variable thermal conductivity along the gas flow path (65,66; Figure 7) is likely anticipated according to the form of Okase's ceramic wool thermal conductivity adjusting member. Wooly material is anticipated to have void spaces resulting in variable thermal conductivity[1].

Okase further teaches:

i. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 1, wherein: the first section comprises an interspace[1] formed

---

[1] **Wool 3 b:** a filamentous mass. Merriam-Webster's Collegiate Dictionary - 10th Ed. p.1362

between the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) and the thermal conductivity adjusting member ("ceramic wool" inside 72; Figure 7; column 9, lines 53-61), as claimed by claim 3

ii. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 3, wherein: the interspace[1] has a varying height along the gas flow path (65,66; Figure 7), as claimed by claim 4

iii. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 1, wherein: the first section comprises a material having a thermal conductivity that is different from a thermal conductivity of a material of the second section, as claimed by claim 5

iv. A semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23), comprising: a reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) that includes a gas flow path (65,66; Figure 7) to allow source gas to pass through and a substrate (2; Figure 7) mount site (support for 2; Figure 7) on <u>an inside surface</u> of the reaction vessel to mount a substrate in the gas flow path (65,66; Figure 7); <u>said substrate mount site (support for 2; Figure 7) being located on a first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23);</u> a heater (76; Figure 7; column 9; lines 62-67) that is disposed outside of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) on <u>said first</u> side <u>(lower half of processing vessel within and including 72; Figure 7; column 9, line 47</u>

- column 10, line 23) of the reaction vessel as the substrate mount site is located, the heater therby being close to the substrate mount site (support for 2; Figure 7), and a cooling device (75; Figure 7; column 9, line 47 - column 10, line 23) to control an internal temperature of thereaction vessel in a section of the gas flow path where the substrate mount site is located, the cooling device disposed outside of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) on a second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) substantially directly opposite to said first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) that the heater (76; Figure 7; column 9; lines 62-67) is located; wherein a wall thickness of the reaction vessel is smaller in the section along the gas flow path where the substrate mount site is located thereby forming an interspace (volume 72 less "wool"; Figure 7; column 9, lines 53-61) between the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) and the cooling device (75; Figure 7; column 9, line 47 - column 10, line 23) to lower a thermal diffusion effect of the source gas in the first section of the gas flow at the location of the substrate mount site, as claimed by claim 6

v. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 6, wherein: the interspace (volume 72 less "wool"; Figure 7;

column 9, lines 53-61) has a height that varies along the gas flow path (65,66; Figure 7), as claimed by claim 8

vi. A semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23), comprising: a reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) that includes a gas flow path (65,66; Figure 7) to allow source gas to pass through and a substrate (2; Figure 7) mount site (support for 2; Figure 7) provided in the gas flow path (65,66; Figure 7) to mount a substrate; <u>said substrate mount site (support for 2; Figure 7) being located on an inside surface of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) along a first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) thereof;</u> a heater (76; Figure 7; column 9; lines 62-67) that is disposed outside of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) <u>along said first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23)</u> <u>and</u> close to the substrate mount site (support for 2; Figure 7), a cooling device (75; Figure 7; column 9, line 47 - column 10, line 23) that is disposed outside of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) on a <u>second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23)</u> <u>of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23), said second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) being substantially</u>

directly opposite to the first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) along which said heater (76; Figure 7; column 9; lines 62-67) is located the cooling device controlling the internal temperature of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23)in a vicinity of the substrate mount site; a plate member (surface 72, Figure 7; column 9, lines 53-61) that is disposed along said second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) opposite to the substrate (2; Figure 7) mount site (support for 2; Figure 7) in the gas flow path (65,66; Figure 7); and a thermal conductivity adjusting member ("ceramic wool" inside 72; Figure 7; column 9, lines 53-61) that is disposed between the cooling device (75; Figure 7; column 9, line 47 - column 10, line 23) and the plate member (surface 72, Figure 7; column 9, lines 53-61); wherein the thermal conductivity adjusting member ("ceramic wool" inside 72; Figure 7; column 9, lines 53-61) provides a first section along the gas flow path with a thermal conductivity different from a second section along the gas flow path to lower a thermal diffusion effect of the source gas in the first section as claimed by claim 9 – see claim 1 for rationale.

vii. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 9 wherein: the first section comprises an interspace (volume 72 less "wool"; Figure 7; column 9, lines 53-61) formed between the reaction vessel

(processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) and the thermal conductivity adjusting member ("ceramic wool" inside 72; Figure 7; column 9, lines 53-61), as claimed by claim 11

viii. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 11, wherein: the interspace (volume 72 less "wool"; Figure 7; column 9, lines 53-61) has a height that varies along the gas flow path (65,66; Figure 7), as claimed by claim 12

ix. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 11, wherein: the first section comprises a material whose thermal conductivity is different from that of the second section, as claimed by claim 13 – refer to claim 1 rationale.

x. A semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23), comprising: a reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) that includes a gas flow path (65,66; Figure 7) to allow source gas to pass through and a substrate (2; Figure 7) mount site (support for 2; Figure 7) provided in the gas flow path (65,66; Figure 7) to mount a substrate, said substrate mount site (support for 2; Figure 7) being located on an inside surface of said reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) on a first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) thereof; a heater (76; Figure 7; column 9; lines 62-67) that is disposed outside of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) along said first

side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) and close to the substrate mount site (support for 2; Figure 7), a cooling device (75; Figure 7; column 9, line 47 - column 10, line 23) that is disposed outside of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) on a second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) thereof, said second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) being substancially directly opposite to the first side (lower half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) along which the heater is disposed to control the internal temperature of the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) in a vicinity of the substrate mount site; and a plate member (surface 72, Figure 7; column 9, lines 53-61) that is disposed along said second side (upper half of processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) opposite to the substrate mount site in the gas flow path, the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) comprises a first section with a wall thickness smaller than a section other than the first section to form an interspace (volume 72 less "wool"; Figure 7; column 9, lines 53-61) between the reaction vessel (processing vessel within and including 72; Figure 7; column 9, line 47 - column 10, line 23) and the cooling device (75; Figure 7; column 9, line 47 - column 10, line 23), to lower a thermal diffusion effect of the source gas in the first section, as claimed by claim 14

xi. The semiconductor film formation device (Figure 7; column 9, line 47 - column 10, line 23) according to claim 14, wherein: the interspace (volume 72 less "wool"; Figure 7; column 9, lines 53-61) comprises a variable height along the gas flow path (65,66; Figure 7), as claimed by claim 16

In the event that "filamentous masses" are not deemed to have variable thermal conductivities:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the density of Okase's ceramic "filamentous masses".

Motivation to optimize the density of Okase's ceramic "filamentous masses" is for optimizing Okase's reaction temperature as taught by Okase (column 1, lines 35-64).

Response to Arguments

3. Applicant's arguments filed August 21, 2006 have been fully considered but they are not persuasive.

4. Applicant's arguments are directly associated with the specific claim amendments filed August 21, 2006. As a result, the Examiner directs the reader to the above new grounds of rejection that are necessitated by Applicant's amendments filed August 21, 2006.

Conclusion

5. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.

10/30/6